

have been made between the present sea-beds and the Chalk, the Gault, and the Greensands, which appear to be among the deepest water deposits now accessible as dry land. Instead of this we are merely told that chalk "must be regarded as having been laid down rather along the border of a continent than in a true oceanic area" (NATURE, p. 134). All geologists are aware, since the publication of Dr. Gwyn Jeffreys' address to the British Association, and the appearance of Mr. Wallace's "Island Life," that some naturalists regard the Chalk as a shallow-water formation, but the former opinion, pronounced as it was by one of the most competent judges, was based exclusively on the present habits of the very few genera of Mollusca that have survived from the Chalk period, and seems quite in contradiction to the far more important groups, the Sponges, Echinodermata, and the minute organisms of which the formation is so largely composed, while no opinion has yet found its way into the hands of geologists regarding the depth of water indicated by the Crustacea and the fishes of the Chalk. Mr. Wallace's collation of the Chalk, as a formation, with the decomposed coral mud of Oahu, is so fantastic as to have failed to carry conviction to the mind of any competent geologist. The points of resemblance between some Globigerina ooze and the Chalk are so numerous and peculiar, that surely the assertion that the latter is a littoral formation, while the former is oceanic, requires strong support. The relative analyses of chips from the Chalk and of Globigerina ooze, quoted by Mr. Wallace, are not by any means final or conclusive. We all know that the silica has been removed and segregated into flints from the White Chalk at Shoreham, and that the iron and other metals are also segregated into crystallised masses, so that a comparison of the Chalk, minus these, is misleading. In like manner the Grey Chalk at Folkestone has lost all its oxide of iron by segregation and crystallisation, and many of the layers are cherty, and unduly rich in silica obtained probably at the expense of other layers in which it is now relatively scarce. During the ages that Chalk has been elevated and has acted as a sponge for the collection of rain water, who can say what other of its constituents may not have been dissolved away or metamorphosed? Siliceous sponge skeletons have been replaced by calcite, calcite shells have been replaced by silica, whilst aragonite shells have been entirely dissolved away. In like manner, can it possibly be contended that the absence of volcanic matter in the Chalk is an important distinction between it and Atlantic ooze? It is an accidental lithological distinction, but nothing more, and merely shows that volcanic dust was not being ejected in the same masses as at present. The Cretaceous and Eocene eruptions, so far as I am aware, are all fissure eruptions of vast magnitude, and the contemporary rocks in their vicinity seem to show that they were not accompanied by the showers of ash that mark eruptions from craters at the present day. Messrs. Renard and Murray have had exceptional opportunities of studying this question, and have no doubt convincing proofs of their statement regarding the littoral character of the Chalk deposit; but I really think that, considering the national character of the undertaking which made the collection of proof possible, it should no longer be withheld. Geologists at present, supposing my feelings are generally shared, are asked to believe that an enormous formation, which shows little, if any, trace of the proximity of land, and abounds with the remains of deep-sea life, was laid down upon a coastline; but beyond the extravagant assertion that it is decomposed coral-mud no reasons whatever for this belief are brought forward, nor are any areas pointed out in which an equivalent to the Chalk is in course of deposition. I cannot conceive why our official geologists have ignored this, one of the most important questions in the whole range of the science. It is little to our national credit that, having spent vast sums in the collection of evidence, we are still in the dark as to its geological significance.

J. STARKIE GARDNER

A Rhyolitic Rock from Lake Tanganyika

THE interesting note by Dr. H. J. Johnston-Lavis on a volcanic rock from the shores of Lake Nyassa (NATURE, p. 62) calls to my mind a couple of specimens in my collection which, with not a few others of interest, have perforce remained for some time undescribed. They were given to me by N. F. Robarts, Esq., F.G.S., who received them from Capt. Hore of the London Missionary Society, by whom they were collected at Cameron's Bay on the south-west of Lake Tanganyika, a little north of the Lofu River. As they are evidently fragments of the same kind of rock, I have only had a slide prepared from one of them. The rock

is externally of a pale yellowish- to reddish-gray colour; compact, but exhibiting faint traces of a fluidal structure, with occasional spots resembling small crystals of decomposed felspar. A fresh broken surface, however, shows the real colour to be a purplish brown, streaked and mottled with a pale reddish tint. Microscopic examination shows that the rock is a rhyolite, somewhat darkened with numerous specks of disseminated ferrite, with many clearer bands, indicative of a fluidal structure. In this matrix are scattered crystals of decomposed felspar, not exceeding $\frac{1}{16}$ inch in diameter, and a few plates of a ferruginous mica, also exhibiting signs of decomposition, with two or three granules of quartz. With crossed Nicols a minute devitrification structure is exhibited by the slide as a whole, and this is coarser and stronger in the clearer bands. Here crystalline quartz is developed, which assumes with the felspars on occasion a spherulitic or sometimes approximately micrographic structure. The larger felspar crystals are rather decomposed, but orthoclase and a plagioclastic felspar can be recognised. Many distinct granules of iron peroxide (? hæmatite) are scattered about. Examination with high powers causes me to doubt whether the devitrification is complete in all parts of the slide, and whether the phenomena are not rather due to the development of a large number of minute crystallites of not very regular form in an isotropic base. In this, however, there is nothing exceptional.

From the structure I should consider it more probable that the specimen had been taken from a flow than from a dyke. I should suspect the devitrification structure to be the result of secondary change, and the rock not a very modern one. In some respects it reminds me of the pre-Cambrian rhyolites (devitrified) of Britain, but I should think it had not quite so high a percentage of silica, *i.e.* that this did not exceed 70, and perhaps was rather less. Among the rhyolitic rocks which I described from Socotra (*Phil. Trans.* 1883, p. 273), collected by Prof. I. B. Balfour, were some of a rather dark purple colour, not unlike to this specimen from Lake Tanganyika.

T. G. BONNEY

Aseismic Tables for Mitigating Earthquake Shocks

IN Mr. Topley's paper on the Colchester earthquake, which appeared in NATURE, vol. xxx. p. 60, he mentions the aseismic joint designed by my father, Mr. David Stevenson, for mitigating the effects of shocks on lighthouses in countries subject to earthquakes, and from information which Mr. Topley has received and cites it would appear that the appliance had been tried in Japan, found wanting, and abandoned. The facts of the case, however, are as follows, and are supplied to me by Mr. Simpkins, who was engaged in fitting up the apparatus sent out from here, and has only recently returned from Japan. Of the seven lighthouse apparatus designed by Messrs. D. and T. Stevenson and furnished with the aseismic joint and sent out to Japan, there are three at present in action, and have been so for ten years, viz. Mikomoto, Siwomisaki, and Yesaki. At Iwosima and Satonomisaki, in the south end of the island, the tables are screwed up so as not to act, as it is reported that no earthquakes are felt at these stations. At Tsuragisaki and Kashmosaki, which are revolving lights, the steadying screws sent out with the apparatus (to prevent the table oscillating while winding up the machine, which is the main inconvenience felt, and which was foreseen) were for some reason not put in at these stations, and the tables were firmly strutted with timber to prevent any motion. These two are the only lighthouses at which any damage has been done; while those stations at which the tables are in operation have never suffered at all, although they have been repeatedly subjected to shocks.

With regard to the effect of wind, to which Mr. Topley alludes, I may say that none of the towers are placed on tables, it is only the apparatus inside the lantern which is so treated, although my father proposed it for the towers themselves, and I have no doubt that, from the experiments I saw made here, they would have been equally effective. Two towers fitted with the tables were made and sent out to Japan, but were unfortunately lost at sea and not replaced.

CHARLES A. STEVENSON

45, Melville Street, Edinburgh, June 16

The "Cotton-Spinner"

ON seeing my article on this rare British Holothurian, Mrs. Fisher—who, as Miss Arabella B. Buckley, is well known to a

large circle of readers—kindly sent me an account of her experience of the offensive use of the Cuvierian organs. She tells me that in the Bay of Rapallo at Santa Margherita, near Porto Fino, she dredged a large black Holothurian, and that “the tangled mass of white threads you mention is so sticky and in such quantity that, after having taken one of these animals out with my hand, I had considerable difficulty in freeing my fingers from the threads; indeed, my hand was not comfortable till I had washed it in hot water.” On the other hand, an inquiry made of a gentleman living at Penzance, and interested in Echinoderms, resulted in the answer that he had never heard of the “Cotton-Spinner.” F. JEFFREY BELL.

The Red Glow

IN your issue of April 10 (p. 549) is the statement by an observer in Australia that the “red glow” was margined by an *immense black bow* stretching across from north-west to south-east.

I wish to say that the above language almost exactly describes the appearance to which I alluded on the same page as “the earth shadow cutting off the upper rim of the first glow.” The “black bow” of the Australian was evidently the shadow of the horizon projected on the haze stratum. In both the above cases the lower surface of the haze was evidently well defined, so that as the horizon intercepted the direct rays of the sun, a well-marked shadow moved westward and downward. Above this black rim or bow appeared the *secondary* glow, produced by the reflection of the sun’s rays from that portion of the haze surface which was directly illuminated. Very often the second glow was more conspicuous and impressive than the first, because it shone against the dark sky of night.

In the *Proceedings* of some association I have just read an astonishing estimate of the height of the haze as 141 miles, based on the fact that it received the sun’s rays one hour after sunset, the fact being strangely overlooked that the late reflection was a *secondary* one.

One evening the shadow or “black bow” was beautifully indented or serrated, doubtless by the shadows of remote cumuli such as are commonly seen in platoons on our evening horizons. The “black bow” was seen only during the first few days of the glows in September. S. E. BISHOP

Hawaiian Government Survey, Honolulu, May 20

P.S.—I hoped long ere this to have sent you data from the Caroline Islands received per *Morning Star*, now much overdue. We fear she has suffered disaster.

Light Phenomenon

THIS evening towards sunset, at 7.55 p.m., there was a column of light extending from the upper part of the setting sun to about 20°, the column being truncated and perpendicular to the horizon. After remaining thus for about two minutes, the sides of the pillar lost somewhat of their perpendicularity, and, with the whole volume of the sun, put on prismatic colouring, the ray (a single one, and still truncated) at times appearing to be a wave of flame. I observed this, with four or five other persons, from the cliffs, and should like to know if the peculiarity of this sunset was observed by others. It continued until 8.20 p.m., when the sun was below the horizon, and the wave of flame ceased. I can hardly better describe this ray than as being very like a northern light, only extremely circumscribed in size, and intensely brilliant. R. D. GIBNEY

Falmouth, June 21

Atmospheric Dust

IN connection with the recent experiments of Dr. Lodge and Mr. John Aitken (described in late numbers of *NATURE*) on the filtration of dusty atmospheres, I have ventured to call your attention to the following, as of possible interest. I have had frequent occasion to note the intensity of the so-called “rain-band,” an absorption-band of terrestrial origin, due probably to the dust and water-vapour present in the atmosphere, and of just less refrangibility than the less refrangible of the D lines, and have at present two continuous records of observations taken, in the main, five times a day, running back a year and a half or so. I have also a very thorough list of the auroral displays which have occurred for the same period in this vicinity. Granting that the aurora is an electric discharge in high regions of the

atmosphere, or, more accurately, where its density is inappreciable compared with that at the earth’s surface, and knowing that according to these recent experiments an electric discharge is capable of precipitating the dust-particles in the atmosphere, it should follow that at times of auroral display, or immediately following, the intensity of this rain-band should be at a minimum. Searching the records to ascertain if any such correspondence could be noticed, it is quite astonishing to find how distinct and well marked this variation in the intensity of the rain-band at times of auroral occurrence is. The atmosphere is full of fine dust-particles, and our very general, though not yet decisively proven, belief is that the aurora is somewhat of a glow-like discharge from electrified air strata, in whose vicinity the density of the dielectric is inconsiderable. The direct inference is that at such times the fine dust and vapour particles are deposited, made to settle, or, uniting together, form an agglomeration, and become perhaps cloud-nuclei. Perhaps other evidence on this matter can be elicited. The records at hand show very plainly just such an agreement as was anticipated.

ALEXANDER MCADIE

26, Garden Street, Cambridge, Mass., U.S.A.,

June 5

Some Botanical Queries

THERE is a plant here with a very large bulb, *Scilla maritima* (?), whose flower I have not seen. I grew two of them in pots last year, but they failed. This plant is set by the peasants near the fig-trees with the idea that these latter will produce better fruit. Is this a mere superstition? or can the *Scilla* be connected in any way with capricification?

Is *Lilium bulbiferum* known to be polygamous? The greater part of the specimens I have found in the mountains near here are staminate, but in some there is a very minute though perfectly formed pistil. Müller, my only book of reference, says nothing on this point.

Is *Trifolium repens* among the list of cleistogamous plants? I am watching a specimen which seems to produce abundant fruit, but no ordinary flowers. LIGUS

Nice, France, June 20

Primæval Man and Working-Men Students

UNDER the above heading you published a letter from me in *NATURE*, August 2, 1883, p. 320, giving the names of four thoughtful artisans, who, after studying the Pitt-Rivers collection of antiquities, and reading my notes in *NATURE*, had made finds of Palæolithic implements in Essex. Ten months have passed since that letter was published, and a fifth student, Mr. W. Swain, has now joined the original party of four. On Sunday, June 15, these admirable workers called upon me with their recent discoveries. They consisted of fifteen Palæolithic implements found in the drift gravels of Leyton, Wanstead, and Plaistow, with the usual complement of flakes. Some of the implements were of the older abraded class, others were as keen as knives, and from my “Palæolithic Floor,” traces of which, as I have pointed out, may be seen in Essex. Three nondescript tools were also lighted on, and four hammer-stones of quartzite with abraded ends, one from Nazing; five Neolithic instruments from Jordan’s Wood, and a large collection of flakes.

The excursions for these tools and flakes have necessarily all been made on Sundays. The finders of the stones are not mere collectors, but men who have mastered the meaning of their subject. W. G. S.

FORESTRY

THE approaching International Forestry Exhibition at Edinburgh, which is to open on July 1 next, and which promises to be a very successful affair so far as the variety of the exhibits and the general arrangements of the Exhibition are concerned, will, it is hoped, prove something more than a mere show during the months it is open to the public. Though the objects exhibited will, in all probability, be a source of considerable attraction and instruction, inasmuch as the arrangement and scope of the several classes seem to have been carefully considered, it is much to be hoped that the Exhibition will be